

American Society for Enhanced Recovery and Perioperative Quality Initiative Joint Consensus Statement on Patient-Reported Outcomes in an Enhanced Recovery Pathway

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Patient-reported outcomes (PROs) are measures of health status that come directly from the patient. PROs are an underutilized tool in the perioperative setting. Enhanced recovery pathways (ERPs) have primarily focused on traditional measures of health care quality such as complications and hospital length of stay. These measures do not capture postdischarge outcomes that are meaningful to patients such as function or freedom from disability. PROs can be used to facilitate shared decisions between patients and providers before surgery and establish benchmark recovery goals after surgery. PROs can also be utilized in quality improvement initiatives and clinical research studies. An expert panel, the Perioperative Quality Initiative (POQI) workgroup, conducted an extensive literature review to determine best practices for the incorporation of PROs in an ERP. This international group of experienced clinicians from North America and Europe met at Stony Brook, NY, on December 2–3, 2016, to review the evidence supporting the use of PROs in the context of surgical recovery. A modified Delphi method was used to capture the collective expertise of a diverse group to answer clinical questions. During 3 plenary sessions, the POQI PRO subgroup presented clinical questions based on a literature review, presented evidenced-based answers to those questions, and developed recommendations which represented a consensus opinion regarding the use of PROs in the context of an ERP. The POQI workgroup identified key criteria to evaluate patient-reported outcome measures (PROMs) for their incorporation in an ERP. The POQI workgroup agreed on the following recommendations: (1) PROMs in the perioperative setting should be collected in the framework of physical, mental, and social domains. (2) These data should be collected preoperatively at baseline, during the immediate postoperative time period, and after hospital discharge. (3) In the immediate postoperative setting, we recommend using the Quality of Recovery-15 score. After discharge at 30 and 90 days, we recommend the use of the World Health Organization Disability Assessment Scale 2.0, or a tailored use of the Patient-Reported Outcomes Measurement Information System. (4) Future study that consistently applies PROMs in an ERP will define the role these measures will have evaluating quality and guiding clinical care. Consensus guidelines regarding the incorporation of PRO measures in an ERP were created by the POQI workgroup. The inclusion of PROMs with traditional measures of health care quality after surgery provides an opportunity to improve clinical care. (Anesth Analg XXX;XXX:00–00)

CONSENSUS STATEMENTS

1. Patient-reported outcomes (PROs) provide an opportunity to improve clinical care and assess quality.
2. We recommend that institutions consistently document PROs in enhanced recovery pathways (ERPs).
3. In an ERP, we recommend that PROs should be collected at baseline, throughout the inpatient stay, and after hospital discharge.

4. At the current time, we recommend that PROs should be collected using the Quality of Recovery Score-15 during the immediate postoperative period (at a minimum on postoperative day 1 and at discharge) and either the World Health Organization Disability Assessment Schedule 2.0 or Patient-Reported Outcomes Measurement Information System, at 30 and 90 days after surgery, if feasible.

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5. We recommend that future research should focus on the consistent application of PROs measures in an ERP to determine their ability to assist in clinical decision making, enhance recovery via a biopsychosocial approach, and provide benchmark quality metrics on a population level.

Patient-reported outcomes (PROs) are measures that come directly from the patient without interpretation by a clinician or anyone else. The use of PROs allows clinicians to focus on outcomes that are important to patients. ERPs have improved outcomes such as hospital length of stay and certain postoperative complications.¹ Perioperative PROs use multidimensional measures that provide a more comprehensive view of recovery after surgery. Multidimensional PROs can be utilized throughout the perioperative period in the areas of preoperative stratification, postoperative optimization, and postdischarge surveillance. Designing care systems that utilize actionable PROs provides the opportunity for quality improvement and comparative effectiveness research.²

In clinical practice, PROs can characterize biopsychosocial recovery trajectories and benchmarks. After surgery, patients can be identified who significantly deviate from an expected recovery trajectory. For example, if a patient reports on postoperative day 5 that he or she still has severe pain, this could trigger a call to the patient to set up an earlier postoperative clinic visit. If patients are not meeting appropriate milestones 1 month after surgery (ie, nutritional intake, physical function, social interactions), targeted interventions could be used to return patients to an expected recovery trajectory. These interventions could possibly decrease hospital readmission, additional clinic visits, or additional resource utilization.

Knowledge of normal recovery patterns, which can be generated from large-scale data collection, can allow perioperative care teams to better educate patients about expectations and goals after surgery.²⁻⁵ Establishing “normal trajectory” of PROs for a specific procedure can be used to educate future patients about what they should expect, eg, moderate pain on postoperative days 1 and 2, but minimal pain by postoperative day 7. It is generally accepted that a patient with realistic expectations is more likely to have higher satisfaction with his or her care and recovery. PROs can provide insight into an individual patient’s postoperative course and insight into recovery trajectories for entire patient populations.

The use of PROs has the potential to enhance shared decision making between surgeons and patients regarding treatment options that can be specific to the type of surgery that they are planning.⁶ For example, Ho et al⁶ compared preoperative and postoperative PROs in patients undergoing ankle surgery. Patients with low preoperative physical function and high pain interference experienced superior outcomes after surgery, whereas patients with less profound perturbation in preoperative physical function and pain experienced a smaller benefit.⁷

PROs can also be used as a tool in quality improvement initiatives and clinical research studies. While enhanced recovery pathways (ERPs) have largely focused on objective measures such as length of stay and immediate complications, PROs allow for a multidimensional, patient-centered

complement to such variables when comparing treatment regimens. Larger system comparisons are also possible (eg, interclinician, interhospital).

The goal of our consensus statement is to provide recommendations regarding the use of patient-reported outcome measures (PROMs) in the context of an ERP.

METHODS

Literature Review

In preparation for the meeting, a comprehensive literature search was performed to identify relevant clinical trials. The search was conducted using the keywords “patient reported outcomes,” “patient-reported outcome measures,” “patient-centered outcomes,” “health related quality of life,” with “surgery,” “enhanced recovery after surgery,” “ERAS” and “enhanced recovery program” using PubMed and Google Scholar. References were also collected from previous systematic reviews that have evaluated PROs in ERPs.^{8,9}

Premeeting Activities

Premeeting activities of the Perioperative Quality Initiative (POQI) PRO subgroup included a series of conference calls and the electronic collection of documents using Google Drive. Pertinent references were collected and distributed electronically. Based on literature searches performed by members, a list of relevant questions was collectively developed. Subgroup members were able to contribute their opinions on PROs in an ERP electronically using Google Docs before the meeting.

POQI Conference

An international group of experienced clinicians from North America and Europe met at Stony Brook, NY, on December 2-3, 2016, to discuss the evidence supporting PROMs. Applying a modified Delphi method¹⁰ designed to use the collective expertise of a diverse group of experts to answer clinical questions, we achieved consensus on several topics related to PROs in the context of an ERP.

In the first plenary session, the POQI PRO subgroup presented clinical questions pertinent to the incorporation of PROs in an ERP. The entire POQI workgroup provided feedback and assistance in refining these questions. In the second plenary session, the subgroup presented answers to these questions, supported by evidence when available, and by expert opinion when no clear evidence was available. Additional feedback was provided by the entire POQI group. During the third plenary session, a series of consensus statements were presented, reviewed, and modified by the entire POQI group to obtain a consensus agreement. According to the National Institute for Health and Care Excellence guidelines, the wording of the recommendations was constructed to focus on an action that needs to be taken and to reflect the strength of the recommendation using language and terms that were agreed on to ensure consistency¹¹ (Table 1).

RESULTS

Literature Review

Six hundred sixty-three clinical trials were identified that focused on PROs or health-related quality of life (HRQOL)

Table 1. National Institute for Health and Care Excellence Guidelines for Strength of Recommendations

Strength	Definition
Strongly recommend	The committee believes that the evidence is strong, supported by numerous high-quality prospective randomized trials
Recommend	Evidence supporting the practice is not as strong, based on high-quality prospective and retrospective studies. The committee feels that benefits of the intervention outweigh the risk for the majority of patients
Consider	There is a lack of quality research to make a recommendation. The committee feels that the practice is safe and likely to be effective based on expert opinion

measures after surgery. Clinical trials were excluded that did not involve an enhanced recovery (or fast track) pathway. Thirteen studies were identified that focused on the use of PROs in the context of an ERP. These studies are shown in Supplemental Digital Content, Table 1, <http://links.lww.com/AA/C189>. PROMs were utilized in these clinical trials to (1) evaluate health care quality of life comparing enhanced recovery and conventional surgical care, (2) measure the return to baseline self-reported health after surgery in an ERP, and (3) compare patients' self-reported health after surgery with population norms.

First Plenary Session: Clinical Questions

The following clinical questions were generated by the POQI PRO subgroup.

1. How do we define PROs?
2. Which PROMs have been used in the context of surgery and in the context of an ERP?
3. What is the optimal method for collecting PROMs?
4. How should we analyze PROMs?
5. How should PROMs be incorporated into clinical practice and future research?

Second Plenary Session: Answers to Clinical Questions

How Do We Define PROs? PROs are any clinical measure that comes directly from the patient without interpretation of the medical team. Appropriate PROMs must assess the physical, mental, and social domains of a patient's well being. A further discussion of PROs is below (see discussion).

Which PROMs Have Been Used in the Context of Surgery and in the Context of an ERP? A review of individual PROMs can be found in Supplemental Digital Content, Text 1, <http://links.lww.com/AA/C189>. Our focus was directed toward PROMs that have been used frequently in the context of surgery including the Quality of Recovery score (QoR) 9, 15, 40, the World Health Organization Disability Assessment Schedule (WHODAS) 2.0, the EuroQol 5 dimension questionnaire (EQ-5D), the Short-Form (SF)-36, and Patient-Reported Outcomes Measurement Information

System (PROMIS). There are only a few studies that have focused on the use of PROMs in the context of ERP.

The POQI subgroup identified the following criteria that were important to selecting an appropriate PROM for use in an ERP (Table 2).¹² The POQI subgroup identified that a key feature to selecting an appropriate PROM is the recall period that the PROM measures. The recall period determines when a PROM should be used in the perioperative setting (QoR-15: 24 hours, PROMIS: 7 days, WHODAS 2.0: 30 days). An appropriate PROM should survey the physical, mental, and social domains of patients during recovery after surgery. An appropriate PROM should have adequate content validity and responsiveness to surgical recovery. Other relevant measurement properties to be considered have been addressed elsewhere.¹² Content validity is defined as the degree to which the content of a PROM is an adequate reflection of the construct of interest.¹² Responsiveness is defined as the ability of a PROM to detect change over time in the construct of interest.¹² Ideally, the PROM can be completed in a reasonable amount of time.

The POQI subgroup identified that it was important to identify PROMs which were valid and responsive to surgical patients. Certain PROMs were found to be less responsive to surgical patients. The EQ-5D was found to be not very discriminative and has a significant ceiling effect when used after surgery, particularly with abdominal and thoracic surgery.¹² In evaluating the SF-36 after surgery, patient SF-36 scores were similar in open versus laparoscopic surgery.^{13,14} An appropriate PROM for use after surgery should detect differences in recovery between these 2 types of surgery.

Alternatively, other PROMs were found to be responsive to changes in the postoperative period. After colorectal surgery, QoR-40 scores were found to drop significantly on postoperative day 1, with significant improvement by postoperative day 3 and return to baseline on postoperative day 6.¹⁵ In 500 surgical patients, the development of a new disability after surgery correlated with lower WHODAS 2.0 scores.¹⁶ Finally, National Institute of Health's PROMIS measures represent a rapidly growing set of instruments utilized in a variety of surgical settings. In a recent review, PROMIS demonstrated reliability in 15 surgical subtypes.¹⁷ Additionally, in other conditions, PROMIS has demonstrated equal if not superior validity compared to measures such as EQ-5D and SF-36.

What Is the Optimal Method for Collecting PROMs?

PROMs should be collected at baseline before surgery, in the inpatient setting and after hospital discharge. A marked decrease in PROM scores is often seen on postoperative day number 1 after surgery with a return to baseline over the next 3–6 days.¹⁵ Therefore, PROM collection is recommended at a minimum on postoperative day #1 and on the day of discharge. Thirty and 90 days were selected as appropriate times to measure outpatient PROMs as these will correlate with postsurgical visits in the outpatient clinic. Collection of PROMs at more distant times (6 months, 1 year) was

Table 2. Criteria to Evaluate Patient-Reported Outcome Measures After Abdominal Surgery

PROM	Content Validity	Responsiveness	Number of Items	Setting	Recall Period	Time to Complete
SF-36	—	Physical ++ Mental – Social +	36	Outpatient	1–4 wk	NR
QoR-9	±	++	9	In hospital/outpatient	Unclear	1.67–2.3 min
QoR-15	?	++	15	In hospital/outpatient	24 h	2.4 min
QoR-40	?		40	In hospital/outpatient	24 h	4.8 min
EQ-5D	—	-	5	Outpatient	Today	NR
WHODAS 2.0		+	12	Outpatient	30 d	NR

Adapted from Fiore et al.¹² +++/– = strong positive or negative evidence; ++/– = moderate or negative evidence; +/- = limited positive or negative evidence; ± = conflicting evidence; ? = unknown evidence.

Abbreviations: EQ-5D, EuroQol 5 Dimension Questionnaire; NR, not reported; QoR, Quality of Recovery (score); SF-36, Short-Form 36; WHODAS, World Health Organization Disability Assessment Schedule.

identified as ideal although these time intervals may not be practical for perioperative teams.

How Should We Analyze PROMs? All patients in an ERP should have baseline PROMs administered before surgery. The collection of PROMs will allow for the analysis of a patient’s self-reported health throughout the perioperative period. Preoperative PROMs can be utilized for risk stratification of a patient before surgery with a prediction of outcomes in an ERP. These tools can be utilized in shared decision making between a surgeon and patient. PROMs in the immediate postoperative time period can provide real time monitoring that allows for treatment adjustments in real time to enhance recovery. Focusing on when a patient’s PROM returns to baseline can be utilized to improve the efficacy of our ERPs. After discharge, PROMs can be used for surveillance, benchmarking, and personalization of recovery trajectories. A patient can be identified for intervention when his or her recovery trajectory is lower than a benchmark trajectory. Postoperative PROMs can be analyzed to assess the impact of an ERP on recovery after surgery.

How Should PROMs Be Incorporated Into Clinical Practice and Future Research? The POQI subgroup was in disagreement as to whether one or a few PROMs should be recommended for use. Each PROM has its own individual advantages and disadvantages. At the current time, there is no one perfect PROM for the perioperative time period. There is very limited evidence supporting the measuring properties of existing PROMs used in the context of recovery after abdominal surgery.¹²

However, the use of the same PROMs by a number of different perioperative teams will allow for quality improvement investigations across multiple health care systems. The QoR-15 and WHODAS 2.0 were found to be responsive and validated to patients in the context of surgical recovery. PROMIS, although not validated in the context of an ERP, is attractive because of the use of specific health domains, development with item response theory and computerized adaptive testing, and calibration against the US population.¹⁸ QoR-15, WHODAS 2.0, and PROMIS, as opposed to others, comply with the minimum standards for PRO measurement in patient-centered outcomes research.¹⁹ At the current time, we recommend that PROs should be collected using the QoR-15 during

the immediate postoperative period (at a minimum on postoperative day #1 and at discharge) and either the WHODAS 2.0 or PROMIS, at 30 and 90 days after surgery, if feasible (Figure 1).

The POQI workgroup identified the following recommendations for PROMs and research. PROMs should be used to define normal trajectory for recovery after surgery from various procedures. PROMs should be used to identify gaps in the recovery process after surgery. Further study is needed to develop new PROMs that are sensitive and validated to the surgical patient. PROMs must be developed in parallel with performance-based measures to enhance the evaluation of both the subjective and objective recovery trajectories. Finally, there is a need to incorporate PROs in normal clinical practice with integration into the electronic medical record.²⁰

DISCUSSION

What Are PROs?

PROs are outcome measures that come directly from the patient without interpretation from the health care team. PROs can be categorized into outcomes, outcome measures, or performance measures.²¹ A patient’s report of pain is an example of a PRO. A patient’s pain can be further defined by using a PROM such as the Brief Pain Inventory,²² a questionnaire that assess the severity of clinical pain and its impact on functioning.

The National Quality Forum published guidelines for developing performance measures from PROs aimed at improving the delivery of health care services, patient health outcomes, and population health.²¹ A PRO-performance measure is based on aggregated data for a population using a PROM. Continuing with our example, the percentage of surgical patients with Brief Pain Inventory Scores above baseline on postoperative day 30 would be an example of a PRO-performance measure.

PROMs are typically categorized as composite score measures or trait/domain specific measures. Composite score measures, such as the Quality of Recovery score (QoR),²³ the WHODAS,²⁴ or the EQ-5D²⁵ can provide summative scores to aid in the assessment of patient-reported health.

Such general PROMs suffer from numerous limits such as ceiling and floor effects, limited use in individual decision making, and marked differences in domains measured.²⁶ On the other hand, domain or trait-specific measurement tools (eg, Beck Depression Scale²⁷ or PROMIS Pain Behavior²⁸) create the opportunity for

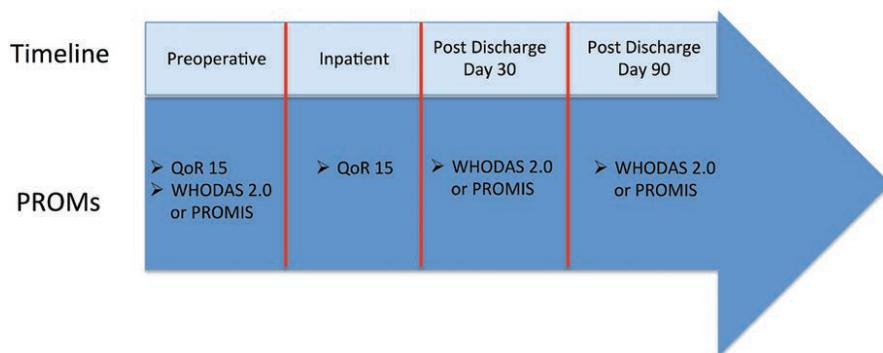


Figure 1. Proposed timeline for patient-reported outcome measures (PROMs) for incorporation in an enhanced recovery pathways (ERPs) using the Quality of Recovery score (QoR)-15, World Health Organization Disability Assessment Schedule (WHODAS) 2.0, or Patient-Reported Outcomes Measurement Information System (PROMIS) measures.

Table 3. Important Recovery-Related International Classification of Functioning, Disability, and Health Categories that Are Represented in the PRO Instruments Used to Measure Recovery

Recovery Content	EORTC QLQ	EQ-5D	GIQLI	QoR	SF-36
B: Body functions					
B1102 Quality of consciousness					
B1300 Energy level	X		X		X
B1302 Appetite	X		X		
B134 Sleep functions	X		X		
B1400 Sustaining attention	X				
B280 Sensation of pain	X	X	X	X	X
B4550 General physical endurance			X		
B525 Defecation functions	X		X	X	
B5350 Sensations of nausea	X		X		
B730 Muscle power	X		X		
d. Activities and participation					
D230 Carrying out daily routine	X	X	X		X
D410 Changing basic body position	X				X
D430 Lifting and carrying objects	X				X
D450 Walking	X	X			X
D460 Moving around in different locations	X				
D550 Eating	X		X		
D640 Doing housework	X				X
D660 Assisting others					
D750 Informal social relationships	X		X		X
D760 Family relationships	X		X		X
D850 Work and employment	X				X
D920 Recreational activities			X		X

Adapted from Lee et al.²⁹

Abbreviations: EORTC QLQ, European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-C30; EQ-5D, EuroQol 5 dimension questionnaire; GIQLI, Gastrointestinal Quality of Life Index; PRO, patient-reported outcome; QoR, Quality of Recovery Score; SF-36, Short-Form 36.

personalized optimization of domains that impact recovery. Currently, a vast number of PROMs (both composite score and domain specific) have been utilized in surgical populations. Those previously used in the context of enhanced recovery after abdominal surgery and the domains of health covered by each PROM are summarized in Table 3.

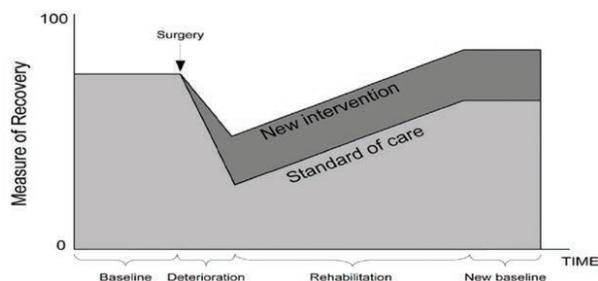
A Framework for Perioperative PROs in ERPs

Figure 2 illustrates the recovery profile of a patient after surgery. Immediately after surgery, a patient’s health status sharply decreases from their baseline. During the days, weeks and months after surgery, the patient proceeds to recover to their baseline health status. New interventions, such as implementation of an ERP, should result in a faster and more rapid return to baseline after surgery compared to standard practices.

Health care quality of life is composed of various physical, mental, and social domains, which are measured by

PROMs. Figure 3⁹ illustrates various factors that contribute to overall quality of life. In the immediate postoperative period, the primary focus of recovery is return of normal biological functions and physical symptoms. Patients must meet specific criteria to qualify for discharge: adequate pain control, eating, drinking, urination, bowel function, ambulation, and activities of daily living. These are measures that health care providers emphasize as important markers of the recovery process and thus impact on the postoperative length of stay. However, recent literature highlights the critical role of biopsychosocial modulators in surgical recovery. For example, behaviors such as pain catastrophizing modulate opioid use, pain, and physical function after a variety of surgeries.^{30,31} Thus, adoption of comprehensive PROs in an ERP model embraces a biopsychosocial model of recovery that may provide additional clinical interventions that can further optimize recovery.

Furthermore, the process of recovery after surgery continues after discharge from the hospital. Patients view



	Baseline	Inpatient	Early Post Discharge	Late Post Discharge
Domains				
Physical	Pain, nausea, vomiting, dyspnea, sleep disturbance, GU disturbance, fatigue, mobility			
Mental	Depression, anxiety, cognitive function, self-efficacy			
Social	Ability to participate in social roles & activities			
PROM Examples	QoR (9,15,40) EQ-5D SF-36 PROMIS WHODAS 2.0	QoR (9,15,40) EQ5D	Qor (9,15,40) EQ-5D PROMIS	WHODAS 2.0 SF-36 PROMIS EQ-5D Life Space Mobility Scale Duke Scale

Figure 2. Recovery after surgery. Inpatient and postdischarge domains of patient-reported outcomes. Examples of patient-reported outcome measures (PROMs) that can be used during their respective time periods. EQ-5D indicates EuroQol 5 dimension questionnaire; GU, genitourinary; PROMIS, Patient-Reported Outcomes Measurement Information System; QoR, Quality of Recovery (score); SF-36, Short-Form 36; WHODAS, World Health Organization Disability Assessment Schedule.

recovery from surgery in terms of freedom from pain, freedom from disability, and return to higher functioning activities.³² The postdischarge period is characterized by a larger mental and social focus as patients return to baseline and desire freedom from disability.

Summary of PROMs of Potential Relevance to ERPs

There is no universally accepted and validated PROM for assessment of recovery after surgery. PROMs that have been frequently used after surgery are reviewed in Supplemental Digital Content, Text 1, <http://links.lww.com/AA/C189>. Table 3 lists the WHO International classification of functioning, disability, and health domains and highlights which PRO instruments survey these specific domains. Currently, no single PROM has been shown to capture all requisite domains, and there is a need for further research to identify and validate PRO tools for surgical patients in ERPs. Many traditional measures were created for medical patients and may not be well suited for use in the perioperative period. Some recently created PROMs have utilized more modern psychometric principles such as item response theory to

develop instruments to maximize precision and minimize response burden.

Examples of PROs in an ERP

Evaluation of an ERP. A variety of PROMs have been used to measure the impact of ERPs outside of traditional objective measures such as length of stay or return of bowel function. In a study of patients undergoing hip and knee arthroplasty randomized to typical care versus an ERP, the EQ-5D questionnaire was administered at baseline and 3 months postoperatively.³³ While the intervention group had a decreased length of stay, this group was also characterized by a greater gain in EQ-5D scores at 3 months. Wang et al³⁴ used PROMs to evaluate patient outcomes and short-term quality of life in patients undergoing colonic surgery. Fifty-seven patients were randomized to an ERP and 60 were randomized to conventional care. Using the EORTC QLQ-C30 and EORTC QLQ-CR 29 (European organization for research and treatment of cancer-quality of life for colorectal cancer questionnaire), they demonstrated that short-term quality of life was better in patients in the ERP group on postoperative days 3, 6, 10, 14, and 21.

However, improvement in PROMs in ERPs has not been universally observed. King et al³⁵ also used the EORTC QLQ-C30, and EORTC QLQ-CR 38 to measure PROs and quality of life after colorectal cancer surgery. Sixty-six patients assigned to an ERP were compared to 86 historical controls. Quality of life health economic outcomes were not significantly different at 2 weeks and 3 months after surgery. One interpretation of this result is that the ERP in this population did not have an impact on patient quality of life. A second plausible interpretation is that the instruments used to measure quality of life may not have been sensitive and responsive in the postsurgical period.

Assessment of Recovery Profiles. PROMs have been measured in an ERP to assess recovery profiles after surgery. This represents a departure from using PROMs at static time points after an intervention in the distant past to assess performance. Instead, assessment of patterns and trajectories of a variety of biopsychosocial outcomes provide the opportunity to intervene on such variables to improve rehabilitation.

Shida et al¹⁵ collected QoR-40 scores on patients undergoing colorectal surgery in the context of an ERP. QoR-40 scores significantly decreased on postoperative day (POD)#1 and POD#3. By POD#6, QoR-40 scores had recovered dramatically and were not significantly different from baseline. The QoR-40 scores at 1 month were also similar to baseline.

Larsen et al³⁶ collected PROs before and after total hip replacement in an ERP at 3 and 12 months. EQ-5D scores continued to rise after surgery and even exceeded population norms at 12 months. However, SF-36 scores after hip replacement were below population norms at 3 months but were equivalent at 12 months postoperatively. Not only does this highlight the dynamic nature of HRQOL measures postoperatively but also that there is a poor understanding of which PROMs best match with surgical subtypes.

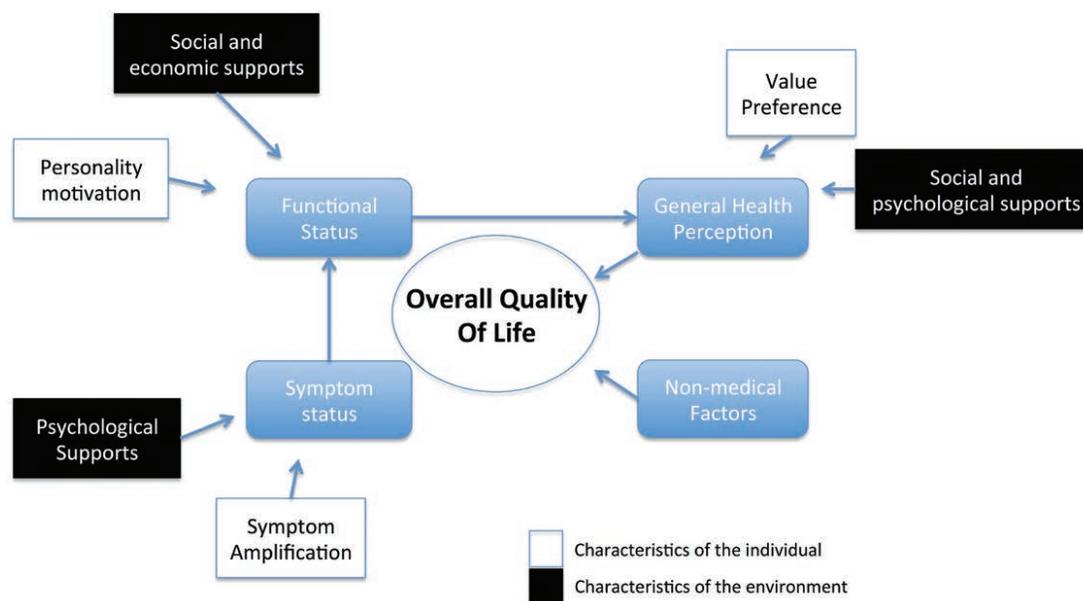


Figure 3. A simplified Wilson-Cleary classification of patient outcomes. Adapted from Neville et al.⁹

A second study by Larsen et al³⁷ analyzed patient HRQOL scores after total knee surgery. Patients were categorized into 2 groups: a higher baseline HRQOL or a lower baseline HRQOL. Patients with higher HRQOL scores matched normal levels at 4 months. Patients with low HRQOL were below population norms at 4 and 12 months and had additional need for postoperative rehabilitation. This observation highlights the ability of PROs to identify a subgroup of patients who may benefit from targeted intervention. Further research is needed to determine the potential benefits of preoperative optimization and postoperative monitoring of such biopsychosocial variables.

Limitations

We did not include patients in our workgroup. Inclusion of patients into this process may have altered our recommendations. Patient input is particularly important with the creation of new PROMs. Our study could have been also enhanced by the addition of psychometricians in our workgroup.

Current research efforts are involving patients and carers in designing outcome metrics. An example of this effort is the Core Outcome Measures in Perioperative and Anesthetist Care-Standardized Endpoints for Perioperative Medicine (COMPAC-StEP) group that is establishing standard end points in perioperative trials.³⁸ This group incorporated input from patients and carers, in addition to clinical experts, to identify what are the most important outcome domains to include in a core outcome set for perioperative studies. The inclusion of patient input should be sought with future PROM recommendations. The POQI workgroup was primarily composed of clinicians and our primary goal was to review current PROMs to determine which PROMs would be optimal for use in an ERP.

We recommend the collection of postdischarge PROMs at 30 and 90 days. In the setting of enhanced recovery, which focuses on the perioperative period, this time period

captures a critical and dynamic time of recovery. Ideally, PRO data should be collected at remote time points (6 months, 1 year) as a variety of complications and variables occur at distant postsurgical time points. However, at this time, surgery-specific expected recovery benchmarks are not standardized and require further research to define. Knowledge of expected recovery benchmarks will allow clinicians to identify specific surgeries where long-term PRO data collection is relevant.

Aspects of a patient's recovery after surgery may be missed within these intervals. The impact of surgery on a patient may continue longer than this time period. Ideally, PROMs could be collected at more remote time intervals (6 months, 1 year); however, this may not be practical for perioperative teams. Future research is needed to identify certain surgeries where the patient recovery continues after 90 days where more remote PROM collection would be appropriate.

Our POQI work group did not address the practical aspects of PROM collection. Data collection of PROs will vary between institutions depending on their local practices and electronic health record infrastructure. Ideally, PROs are administered and captured in an electronic health record and integrated with clinical workflow. Key to PRO data collection is a system that returns the data collected to the medical team. E-mail or text messages are methods external to electronic health records and may be utilized to collect PROMs. Also, PRO systems must be able to adapt to heterogeneous clinical scenarios such as prolonged hospitalization, repeat surgeries, or cancelled interventions.

Our recommendations do not incorporate the patient experience as a measure of quality. The Agency for Health Quality and Research recommends that "combining patient experience measures with other measures of quality is critical to creating an overall picture of performance."³⁹ Certainly, process measures that improve patient experience, PROs, and traditional measures of health care quality (mortality, morbidity, complications, length of stay) would be ideal.

CONCLUSIONS

Consensus guidelines were created by the POQI workgroup regarding the incorporation of PROMs in ERPs using a modified Delphi process. The collection of PROMs will allow us to better understand normal recovery trajectory after surgery. PROMs provide us a tool to assess our patients after hospital discharge and identify patients who will benefit from interventions aimed to enhance recovery. We hope that all ERPs will collect these recommended PROMs as this will allow us to compare processes across health care systems. Future study should focus on the incorporation of PROMs into our daily clinical practice and the development of new PROMs ideal for the perioperative time period. ■■

APPENDIX

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DISCLOSURES

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Conflicts of Interest: R. E. Abola participated in the conference, and was cochair of the Patient-Reported Outcome group.

Name: Elliott Bennett-Guerrero, MD.

Contribution: This author helped write, review, and edit the manuscript.

Conflicts of Interest: E. Bennett-Guerrero participated in the conference, and was chair of the Patient-Reported Outcome group.

Name: Michael L. Kent, MD.

Contribution: This author helped write, review, and edit the manuscript.

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Name: Liane S. Feldman, MD.

Contribution: This author helped write, review, and edit the manuscript.

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